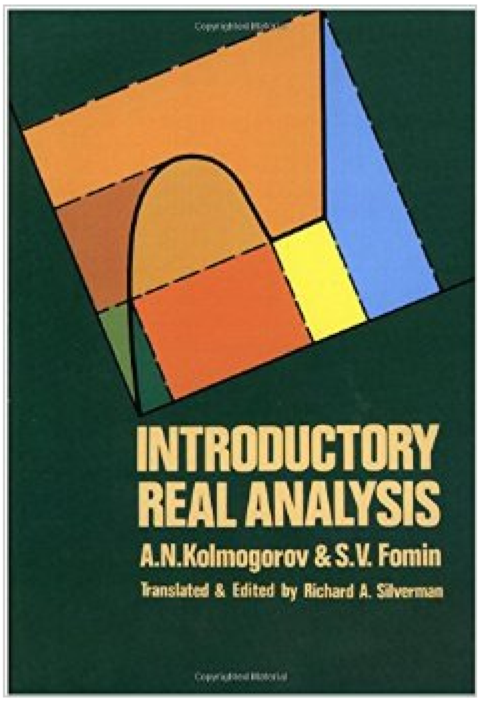
Introductory Real Analysis (Dover Books On Mathematics)



Synopsis

This volume in Richard Silverman’s exceptional series of translations of Russian works in the mathematical science is a comprehensive, elementary introduction to real and functional analysis by two faculty members from Moscow University. It is self-contained, evenly paced, eminently readable, and readily accessible to those with adequate preparation in advanced calculus.The first four chapters present basic concepts and introductory principles in set theory, metric spaces, topological spaces, and linear spaces. The next two chapters consider linear functionals and linear operators, with detailed discussions of continuous linear functionals, the conjugate space, the weak topology and weak convergence, generalized functions, basic concepts of linear operators, inverse and adjoint operators, and completely continuous operators. The final four chapters cover measure, integration, differentiation, and more on integration. Special attention is here given to the Lebesque integral, Fubini’s theorem, and the Stieltjes integral. Each individual section â ” there are 37 in all â ” is equipped with a problem set, making a total of some 350 problems, all carefully selected and matched.With these problems and the clear exposition, this book is useful for self-study or for the classroom â ” it is basic one-year course in real analysis. Dr. Silverman is a former member of the Institute of Mathematical Sciences of New York University and the Lincoln Library of M.I.T. Along with his translation, he has revised the text with numerous pedagogical and mathematical improvements and restyled the language so that it is even more readable.

Book Information

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Customer Reviews

First, let us be precise in reviewing this book. It is NOT a book by Kolmogorov/Fomin, but rather an edited version by Silverman. So, if you read the first lines in the Editor’s Preface, it states, "The present course is a freely revised and restyled version of ... the Russian original". Further down it continues, "...As in the other volumes of this series, I have not hesitated to make a number of pedagogical and mathematical improvements that occurred to me...". Read it as a big red warning flag. Alas, I would have to agree with the reader from Rio de Janeiro. I’ve been working through this book to rehash my knowledge of measure theory and Lebesgue integration as a prerequisite for stochastic calculus. And I’ve encountered many results of "mathematical improvements" that occurred to the esteemed "translator". Things are fine when topics/theorems are not too sophisticated (I guess not much room for "improvements"). Not so when you work through some more subtle proofs. Most mistakes I discovered are relatively easy to rectify (and I’m ignoring typos). But the latest is rather egregious. The proof of theorem 1 from ch. 9 (p.344-345) (about the Hahn decomposition induced on X by a signed measure F) contains such a blatant error, I am very hard pressed to believe it comes from the original. That book survived generations of math students at Moscow State, and believe me, they would go through each letter of the proofs. Astounded by such an obvious nonsense, I grabed the only other reference book on the subject I had at hand, "Measure Theory" by Halmos. The equivalent there is theorem A, sec. 29 (p.121 of Springer-Verlag edition), which has a correct proof.For those interested in details, Silverman’s proof states that positive integers are strictly ordered: k1

The advantages of this text have been pointed out by other readers, so I will attempt to exhibit the problems of this book.There are a lot of mistakes. And by ’a lot’, I mean that the careful reader should be able to find at least 5 mathematical mistakes in each chapter. I used this text mainly as a supplement to a fairly advanced analysis course, and we’d often have problems from it used in our problem sets. At first, it appeared as if this were a very well-written text, but once we started with our problem sets, there were at least 2 e-mails sent out per week addressing a concern a student had pointed out. After a while, students stopped e-mailing the professor with their concerns, instead just assuming that they were correct whenever they spotted something weird.Let’s take an example:Problem 1, pg. 137: Let M be the set of all points x = (x1, x2, ..., xn, ...) in l2 satisfying the condition \sum^{\infty}_ (n^2) (x_n)^2 \le 1. Prove that M is a convex set, but not a convex body.The problem with this is that M IS easily a convex body, precisely because x = (0,0,...) is in M.There are many more big mistakes and little mistakes throughout the exercises, oftentimes destroying the entire POINT of the problem. Take, for example, Problem 1 of pg. 76: Let A be a mapping of a metric space R into itself. Prove that the condition $p(Ax,Ay) < p(x,y)$ $(x\ne y)$ is insufficient for the existence of a fixed point of A.Now, a counterexample here can be easily produced, even by the most elementary reader. But the exercise quickly becomes worthwhile if we make R complete. It’s the little things that count in mathematics, and the small errors like these are clearly detrimental to the student.

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